DOCUMENT RESUME

ED 125 924 SO 009 129

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TITLE The Interaction of School Environment and Student Traits.
PUB DATE Apr 76
NOTE 22p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, California, April 19-23, 1976); Not available in hard copy due to marginal legibility of original document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Ability Grouping; *Academic Achievement; Comparative Education; Competitive Selection; *Cultural Differences; Educational Research; Interaction Process Analysis; *Racial Differences; School Environment; Secondary Education; *Student Grouping; Student Mobility; Student Motivation

ABSTRACT

This study analyzes the relationship between student achievement and school mobility climate. The hypothesis is that an average individual achievement score tends to drop as the school mobility climate becomes increasingly more selective. A selective climate classifies students by ability or achievement as early as possible through tracking or ability grouping, whereas a contest mobility system thrives on constant student competition for student ranking. The sample population includes 2,762 eighth-grade students, classified by ethnic group membership, in 19 Israeli junior high schools during the 1972-73 school year. Results indicate that after controlling for socioeconomic factors, Asian and African students perform less well than students of European or American extraction in every mobility environment. The achievement for the Asian-African group progressively deteriorates as the school mobility climate becomes more selective. European-American students also perform poorly in selective schools, yet comparatively better than the Asian-African students. The value of competition in each culture is described as a possible cause for these differences. (DE)

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THE INTERACTION OF SCHOOL ENVIRONMENT AND STUDENT TRAITS

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April, 1976

AERA Annual Meeting, San Francisco, April 19 - 23, 1976

SP009139

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The Interaction of School Environment and Student Traits

The question of person-environment interaction in the field of education has been the subject of much discussion and investigation for many years. At the psychological level, the concern has been to understand why certain instructional methods or materials are more effective with some types of pupils than with others. Terms such as "aptitude-treatment interaction" (Bracht, 1970), "trait-treatment interaction" (Berliner and Cahen, 1973), and "behavior-person-environment paradigm" (Hunt, 1975), have been commonly used to describe the interaction taking place between individual personality traits and an educational treatment to produde a particular behavioral outcome.

On the sociological plane, researchers have been interested in the effect which different types of schools have on the achievement, aspirations, creativity and motivation of students possessing differing initial abilities and deriving from various home backgrounds. School differentials have been measured on a number of dimensions, most common among them being financial resources, staff qualifications, class size and student body composition (Wilson, 1959; Spady, 1973; Jencks and Brown, 1975; Bidwell and Kasarda, 1975; Coleman, 1975).

Little attention has been paid, however, to what might be called school atmosphere, an amorphous concept which to some extent might be measured by the school properties mentioned above but which at the same time is something more comprehensive and pervading. The general atmosphere in a school might be characterized in any number

of ways. For instance, a school climate might be competitive rather than non-competitive, restrictive rather than permissive and elitist rather than universal in orientation. These properties will express themselves in the instructional program, formal organizational structure and student-staff relationships in the school. In addition, they will influence a student's motivation and achievement as well as bear an impact on his attitudes and self-concept. As it is believed that particular instructional methods and programs work better with certain kinds of students, it is also conceivable to hypothesize that different school atmospheres will interact with individual traits to elicit varying outcomes.

One very important aspect of school environment which has won some attention both theoretically and empirically, is the mobility system permeating the school's selection procedures (Turner, 1960; Porter, 1974; Yuetman and Samuel, 1975; Chen, 1975). Turner has identified two ideal types in his discussion of mobility: sponsored and contest. In a sponsored mobility system, students are selected according to certain specifications to join the elite at a particular stage in their schooling. This selection is irreversible and results, on one hand, in a careful grooming of candidates for future leadership positions and, on the other hand, in a casting aside of those found unfit for the top. On the reverse side of the coin is the contest mobility system which thrives on constant competition and is based on the social Darwinian principle of the survival of the fittest.

Accordingly, in such a system, those students who compete successfully make their way up the educational ladder and thereby win the right to occupy society's most influential and prestigious occupations.

Since the sociological concept of a mobility pattern is usually applied to entire societies, Turner's ideal types have been used more commonly in the cross-cultural comparison of school systems. However, it is feasible that within a single society, particularly in one characterized by a highly diversified population and a ly relatively decentralized educational system, schools themselves can can be identified along a sponsored-contest mobility continuum. Several studies have been done showing that the two patterns can exist side by side (Porter, 1974; Chen, 1975).

The mobility pattern of a school will be primarily reflected in the rigidity of the selection procedures used in the school. In other words, schools having a sponsored mobility atmosphere will tend to classify students according to ability or achievement as early as possible through tracking, streaming or ability-grouping. A disproportionate amount of attention will be bestowed upon those students found in the higher levels and the resulting relative neglect of the slower students will be expressed in a high dropout rate. Schools possessing more of a contest mobility climate adopt a more universal approach. They will tend to establish heterogeneously composed classes and by catering to the needs of both the bright and slow students, will be better able to hold onto all of their students.

The impact of selection procedures on achievement and motivation has been the focus of a number of studies, which have yielded fairly consistent results. Rosenbaum (1975) demonstrated that tracking in high schools tended to have an effect on IQ independent of such variables as family SES, sex and earlier IQ. Evidence showing a similar track effect on achievement was provided by Shafer and Olexa (1969). In both cases the tendency observed was for the top groups to gain and the bottom groups to lose. Another study conducted by Himmelweit (1966) indicated that streaming influenced student dropout. Compared to schools in which there was no streaming, he found that in "streamed" schools fewer bright and average students left school while many more slow students dropped out. Similarly, streaming has also been shown to affect motivation and achievement(Partridge, 1966).

In contrast to the findings cited above, Goldberg and Passow (1966) and Borg (1965) found few, if any, effects of ability grouping on achievement. In addition, in a study done by Christie and Griffin (1970), it was shown that when the top students are separated from the others into different institutions, the achievement of the bright pupils was negatively affected.

In the present study, interest is not on the effect of any specific selection procedure. Rather, the contention is made that the presence or absence of formal selection means together with other indices, such as the dropout rate, reflect the mobility norms adhered to in the school, and hence the prevailing learning atmosphere. The school environment, so defined, will interact with individual student traits

such as socio-economic status, ethnic group membership and locus of control in influencing achievement scores.

The Study

Information collected for this paper was a by-product of a large scale longitudinal study of the Israeli junior high school (Adler, Chen and Lewy, in progress). The individual data which will be quoted here were gathered on 2762 eighth grade pupils who were attending 19 junior high schools during the 1972-1973 school year. These schools constituted the study sample of the larger project and had been selected to represent the various types of schools common in the country (urban vs. rural, parochial vs. secular, large vs. small).

Eighth grade achievement served as the dependent variable and was measured by a battery of six standardized achievement tests which had been administered to the students at their completion of the eighth grade. An individual's achievement was determined by his overall score (percentage of items answered correctly) on all six examinations. The school subjects covered in the tests were mathematics, reading comprehension, social studies, science, English as a foreign language, and bible studies; all of these subjects constituted required studies for all students.

Data concerning individual trait variables were collected as part of an attitudinal and informational questionnaire which was administered to the students jointly with the achievement tests.

Ethnic group membership was dichotomously defined as Oriental, i.e. those students of Asian or African extraction, and Western, i.e. those children of European or American origin. This is the division commonly used for the Jewish population in both research studies and the Israeli Census Bureau Abstracts, and is one which adequately reflects the major cultural cleavage in the country.

The second trait variable which was examined was locus of control, or rather an individual's belief in the power he has over his own destiny. This characteristic was measured by a number of questions which had been adopted from scales used in several earlier studies (Rotter, 1966; Coleman et al, 1966; Gurin et al, 1969). Originally 10 items had been employed to measure locus of control in the personal, ideological and educational realms, however after performing factor analysis, it was decided to construct an index using only six of the items. The index which was obtained (Cronbach's alpha = .467) enabled the ranking of individual's on a six-point scale. A low score on the scale indicated that an individual believed his destiny to be controlled by outside forces (externality), while a high score meant he believed in his own ability to shape his life (internality).

Although the effect of a student's socio-economic status was not of immediate interest in the present study, this variable was measured and served as a control. First of all, early analysis of the data had shown SES to be highly related to achievement (r = .60). In addition, in a previous discussion of school selectiveness (Chen et al, 1975), it was found that the proportion of lower class students in the student

body tended to be positively related to the degree of selectiveness manifested in the school. Thus, fearing that SES differentials between the various types of schools would color all other findings, it was decided to use this variable as a control. An individual's SES was expressed on a scale ranging from 3 to 20. This measure constituted an index (Cronbach's alpha = .54) that had been composed, after factor analysis, of three variables: (1) number of siblings; (2) father's level of education and (3) abundance of books in the home.

Finally, the school's mobility climate which will be similarly referred to here as school selectiveness, was constructed as an index composed of the school's dropout rate and the degree to which homeroom classes (in which the majority of subjects were taught) were homogeneous in make-up as measured by the between-class variance in achievement scores.* Schools were ranked on a three-point scale as non-selective, mildly-selective and very selective. Validity of this measure was obtained by showing that selectiveness in a school was found to be highly related to the use of entry selection procedures, partial ability grouping, and classroom reorganization and homogenization. Moreover it was not related to the overall academic heterogeneity of the student body.

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* For a more detailed description of how this index was constructed, see Chen et al, 1975.

Research Hypotheses

On the basis of the findings concerning the effects of tracking, streaming and ability grouping which generally revealed an improvement in performance for the top levels and a decrease for the bottom groups, one would expect the average achievement in a school to decrease as the degree of school selectiveness increases. Theoretically speaking, two assumptions are made here: (1) that a rigid mobility atmosphere tends to stifle motivation and hence the performance of those students who are not found at the top and (2) that the top level students are a minority in any school population and therefore their gains do not balance out the loss of the others.

Many previous studies have shown a rather strong relationship between ethnic group membership and school performance in Israel, Westerners tending to do better than Orientals (Smilansky and Yam, 1969; Lewy and Chen, 1974; Chen et al, 1975). Since this relationship is not entirly explained by conventional SES measures, one would expect that in all school climates, the average achievement score for Asian-African students will be lower than for European-American students. In addition, it is possible that student selection and classification will have been influenced in part by the subjective feelings and expectations, whether concealed or not, of the teaching and administrative staff, the great majority of which are European or American in origin. Thus the differences between the two groups should increase as the school's climate becomes more selective. Stated differently, one can expect that children of Asian or African background in very

selective schools will tend to lose out more than children of European or American origin.

Finally, one would expect that students who are fatalistic in orientation, that is displaying an external locus of control, will tend to do less well in a highly selective environment. Since the atmosphere in selective schools in general is stifling, students who manifest an internal locus of control will probably perform less well also, however their decrease in performance will be less. At the same time, one would expect that locus of control will be a more salient predictor of achievement in highly selective schools than in others, since an exceedingly strong sense of individual self-determination will be essential for overcoming the effects of an unencouraging environment and for motivating a youngster to achieve. This should be particularly true for Oriental students, since, as indicated above, fewer are expected to enter the elite groups.

The Findings

Looking at Table 1, one can see that despite the high correlation, as quoted earlier, between SES and achievement, the school environment continues to have an effect on achievement. As hypothesized, the average individual achievement score tends to drop as the school mobility climate becomes increasingly more selective. An analysis of covariance test yielded an F of 5.718 which with two degrees of freedom was found significant at the 0.05 level.

Table 1: Average eighth grade achievement scores (% of items answered correctly) for students in various school climates based on selection procedures, before and after control for SES.

School Climate	$\bar{x}$ Achievement Score		N
	before control for SES	after control for SES	
non-selective	65.8	60.5	1089
mildly selective	55.1	57.8	769
very selective	52.1	56.3	904
Total	58.3	58.4	2762

If the average achievement scores for each ethnic group are reviewed separately, one finds several interesting phenomena. First of all, as expected, Asian-African students perform less well than students of European or American extraction in every mobility environment after controlling for SES.

Table 2: Average eighth grade achievement scores (% of items answered correctly) for students of Asian-African origins and students of European-American origins according to school climate, after controlling for SES.

School Climate (A)	$\bar{x}$ Achievement scores	
	Asian-African	European-American
non-selective	57.0	63.0
mildly selective	56.8	58.4
very selective	54.0	60.0

Main effects

A	F= 3.03	$p < .05$
B	F= 35.25	$p < .05$

Interaction effects

AB	F= 5.09	$p < .05$

Contrary to expectation, however, the achievement gap between the two groups does not tend to widen. In fact, in mildly selective schools it becomes substantially smaller. Inspection of the curves which might be projected from the two distributions indicates that the two groups are differentially effected by school climate. The relationship between achievement and school climate for Asian-African pupils can be depicted by a negatively-sloped straight line. In other words, achievement for this group progressively deteriorates as the school mobility climate becomes more selective, the greatest drop occurring between mildly and very selective environments. On the other hand, the relationship between these same two variables for the European-American group resembles more of a U or J curve. Achievement is highest in the non-selective schools, drops considerably in the mildly selective schools, and then rises again slightly in the very selective schools. That there is indeed a statistically significant interaction between environment and ethnicity is substantiated by the F values which were obtained in the analysis of covariance as seen at the bottom of Table 2.

The entire picture becomes more complicated when locus of control is included. One can see in Table 3 that main effects and all

interaction effects involving variable pairs are statistically significant to the 0.05 level. Three-way interaction between ethnicity, locus of control and school mobility climate was not discovered. Insofar as the patterns for the two ethnic groups were quite different from one another, each will be dicussed separately.

Table 3: Average eighth grade achievement scores (% of items answered correctly) for students of Asian-African origins and students of European-American origins according to locus of control and school climate, after controlling for SES.

School Climate (A)	Ethnic Group (B)	$\bar{x}$ Achievement Scores — Locus of Control (C)					
		ext. 1	2	3	4	5	6 int.
non-selective	A - A	43.8	49.2	53.9	64.0	63.4	63.7
	E - A	57.7	58.0	61.1	64.6	68.6	71.8
mildly-selective	A - A	48.6	52.5	57.2	57.9	62.9	62.2
	E - A	54.9	53.6	56.1	57.9	61.4	68.7
very selective	A - A	44.8	50.4	50.6	59.8	63.2	64.2
	E - A	46.9	59.4	60.8	60.9	66.8	68.3

Main effects

A $F = 3.71$, $p < .05$

B $F = 33.68$, $p < .05$

C $F = 43.88$, $p < .05$

Interaction effects

AB $F = 4.79$, $p < .05$

AC $F = 1.94$, $p < .05$

BC $F = 3.28$, $p < .05$

ABC $F = 1.38$, not significant

For European-American students one finds that the range in achievement scores becomes progressively greater as the school's

climate becomes more selective. In the non-selective schools the range is 14.1 percentage points, while in the mildly selective and very selective schools the range is 15.1 and 21.4 percentage points, respectively. Also, as predicted, the greatest drop in performance was observed among the most "external" students (10.8 percentage points), whereas the least change was noted among the most "internal" students (3.5 percentage points). However, one finds that achievement decreases as the school environment becomes more selective only for these two groups of children- the most internal and the most external. At all other levels of locus of control a U curve is found indicating that the performance of European-American pupils in mildly selective schools suffers the most damage.

The pattern for students of Asian or African origins departs even more sharply from the expected one. One can observe from the table that the range in achievement scores is least for mildly selective schools (14.3 percentage points) and about equal for very selective and non-selective schools (about 19.6 points of the average). Upon examination of the various categories of locus of control, one finds an explanation for this finding. It can be seen that in mildly selective schools, external students tend to perform better than in other kinds of schools, while internal students tend to achieve less, thereby closing up the range.

Like their European-American brethren, children of Asian or African backgrounds, who are highly "internal", tend to exhibit the least variation in achievement. In contrast, however, in this ethnic group, it is the students who are neither very internal nor

very external in outlook who are affected most by changes in school environment.

Before attempting to discuss the implications of these findings, the question of saliency must still be addressed. It was hypothesized that an individual's locus of control would be a more salient predictor of achievement as the school's atmosphere became more selective. Looking at the partial correlations for the total student population in Table 4, one finds some support for this contention. The [illegible] coefficient for the correlation between achievement and locus of control, while controlling for SES, increases in strength as the school becomes more selective.

Table 4: Partial correlations, controlling for SES, between eighth grade achievement and locus of control in the various school climates for Asian-African students, European-American students and total population.

School climate	Asian-African	European-American	Total
non-selective	r = .33	r = .25	r = .29
mildly selective	r = .32	r = .23	r = .30
very selective	r = .42	r = .24	r = .37

The respective correlation coefficients for the two ethnic groups supply an additional dimension to this finding. First of all, in all types of school mobility climate, locus of control is a more salient indicator of school performance for Asian-African students than for European-American students. Secondly, the strength of the relationship between locus of control and achievement does not differ

from one school climate to another for students of European-American extraction. Variations in the strength of the relationship do exist for Asian-African children. For this group the relationship is strongest in the very selective schools but weakest in the mildly selective schools. It appears then that the increased saliency which was observed in the total population is somewhat of an artifact insofar as the changes in the correlations are a function of both the correlation changes for the Asian-African group and the differential proportions of the two groups in the schools.

Discussion

Although not all of the initial hypotheses were confirmed, the data which have been presented on the preceding pages definitely establishes the existence of a person-environment interaction in determining achievement. Clearly, certain kinds of students react differently to the various school mobility climates.

First of all it was seen that after controlling for socio-economic factors, the achievement of the European-American group appeared to be more sensitive to changes in the environment than the achievement of the Asian-African group. These students were unquestionably most successful in non-selective schools, that is in a contest mobility climate.

Two possible explanations may be offered for this phenomenon. On one hand it might be suggested that the increase in achievement

of European-American students in non-selective schools occurs essentially among the average and below-average students and that it is a result of status-gain. Whereas in a sponsored mobility atmosphere an individual's academic standing is clearly defined by the level of his ability group or track, in a competitive environment less information is publicly known about his academic achievements and consequently other factors take pre-eminence in determining his status. In the Israeli context, a student's ethnic group will most certainly be one of these factors. Therefore, the average and below-average European-American student in a competitive environment will enjoy a higher status than in a sponsored environment. This should serve as a motivating factor which will be reflected by an increase in achievement.

A second explanation, which might be viewed as complementary rather than contradictory to the one offered above, emphasizes the cultural differences between the two ethnic groups. It is possible that the particular cultural heritage of students from European or American background has endowed them with the necessary motivation and know-how which are suitable for success in a competitive atmosphere. When they are situated in a more sponsored environment, these qualities lose their effectiveness and hence their achievement suffers. This supposition does not seem too farfetched when one considers that Western societies tend to be more highly competitive and achievement-oriented than the societies of the Third World. The parents of Asian-African children, having derived from cultures in which status is more ascribed than achieved, have not infused their offspring with

a competitive orientation and therefore the achievement of this group is neither as sensitive nor as high as the achievment of the European-American group.

A further instance of person-environment interaction can be observed in the fact that a selective environment does not appear to have a simple linear effect on achievement. Although achievement did tend to decrease as school selectiveness incresed for the very internal and very external students of European or American descent, in all other locus of control categories achievement was at its lowest for this group in the mildly selective rather than the very selective schools. A partial explanation for this U curve might be found in the relative proportions of the two groups in the school populations. In an earlier study it was found that the school climate became more selective as the proportion of Asian-African children in the student body increased (Chen et al, 1975). If European-American students tend to more often comprise the top level groups, then in very selective schools, in which they are overwhelmingly in the minority, relatively few of them will be found at the lower levels. This fact will tend to perhaps artificially raise the average achievement for this group above that which is found in the mildly selective schools in which there are more European-American students.

With regard to students of Asian or African background, the effect of school climate was once again not linear when one inspected the various locus of control groups although the net effect as seen in Table 2 was one of linearity. It was found for this group that in mildly selective school "externals" tended to perform best as

compared to in other types of schools and "internals" did poorest.

Reviewed as a whole, it appears that a mildly selective environment produces the greatest variation in outcomes. Perhaps the explanation for this derives from a situation in which the signals communicated by the school to the student are unclear and confusing. Ideologically speaking the school might ascribe to an open and competitive environment while not really permitting free access to academic rewards. Such a situation could confound the student, paricularly is he is achievement-oriented, and likewise affect his motivation.

In general, there appears to be little evidence to indicate that certain types of students thrive more in a mildly selective or very selective atmosphere than in a non-selective one. Certain groups in the Israeli student population, such as Asian-African students and students who are high in internal control, tend to be little affected by changes in the environment. In most cases, however achievment is at its highest in a competitive atmosphere.

In order to fully understand the impact of a school's mobility climate, it is necessary to proceed further and investigate the effects of person-environment interaction on such variables as student aspirations, self-concept, attitude towards school, and later adult occupation.

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